

Study the incidence of *Candida* infection in Diabetic patients submitted to the Balad Town Hospital in Salah –Eldeen, Province

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Abstract:

This study was done at Al-Balad City Hospital on 60 diabetic patients (25 male and 35 female). The study included Fasting Blood Sugar and fungal diagnosis (systemic and superficial fungus). The results showed that the high concentration of blood sugar belonged to the group > 70 years among the diabetic patients with high significant differences in comparison with other groups $P < 0.001$.

The result showed that percentage of female systemic fungus infection was higher than male systemic fungus infection (female 63% and male 24%) and vice versa about superficial fungus infection (female 37% and male 76%).

Data showed that the percentage of nail fungus infection among female diabetic patients was higher than the percentage of male diabetic patients (female 73% and male 56%) and vice versa about the finger fungus infection (female 27% and male 44%) (table and figure 5)

The percentage of diabetic patients with fungus infection treated with tablet were higher than percentage of diabetic patients with fungus infection treated with insulin. So, the fungus infection is one of complication of diabetes mellitus .

Key words: *Candida*, Diabetes mellitus, systemic, superficial.

Introduction:

Diabetes mellitus (DM) is a world wide problem and the most common endocrine disorder. Its prevalence increasing in the present in most countries of the world (Iraq is one of these countries) , scenario of a sedentary life style in the general population[1].

Diabetes mellitus (DM) is a chronic medical condition meaning it can last a life time. The cause of elevated blood glucose level depend on the type of diabetes , that the patient have the type of diabetes and their causes include[2] .

Type I diabetic: is an autoimmune disease when the body's system for

fighting (the immune system) turns against a part of the body.

In diabetes the immune system attacks and destroy the insulin – producing beta cells in pancreas, then produce little or no insulin.

A person who has type I diabetes must take insulin daily to live at present scientists do not know exactly but they believe that autoimmune genetic and environmental factors accounts for about 5 to 10 percent of diagnosed diabetes in the United state [3] .

Type I Diabetes known as insulin dependant diabetes mellitus (IDDM) occur early in life and quickly become sever , the incidence increase with age 10% of the patients has type I

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and the remaining increase (90%) have type II[4].

Maturity onset diabetes of youth (MODY) :- This is rare , inherited form of type II diabetes that usually affect teenagers[5] .

Type II Diabetes : The most common of diabetes is type II diabetes , about (90-95) percent of people with diabetes have type II this form of diabetes is most associated with older age , obesity , family history of diabetes , previous history of gestational diabetes , physical inactivity and certain ethnicities . Type II diabetes is increase being diagnosed in children and adolescents[6] .

Gestational Diabetes :-Some women develop gestational diabetes late in pregnancy , although this form of diabetes usually disappear after the birth of the baby , women who have had gestational diabetes have a (20) to (50) percent chance of developing type II diabetes with in 5 to 10 years.

Abnormalities of insulin and elevated blood glucose level lead to metabolic vascular , neurological and immunological abnormalities.

Affected organs include the cardiovascular , renal , nervous system , eyes and the skin.[7].

The skin is affected by both the acute metabolic derangements and the chronic degenerative complications of diabetes , although the mechanism for many diabetes associated skin conditions remains unknown.

The association of certain skin disease with diabetes mellitus has been well recognized with an incidence rate ranging from 11.4 to 71%[8].

Candida infection :

Yeast (*Candida albicans*) infections are common in diabetic patient, involvement of the glans penis and of the vulva appear common in

type II diabetes vaginal candidiasis is almost universal among women with long term diabetes, and yeast infections may even be the presenting manifestations of diabetes[9].

Vulvo-vaginal candida infection is an especially common problem for the diabetic women[10] . Angular stomatitis due to candida is a classic complication in diabetic children and an occasional complication in diabetic adults, increased concentration of salivary glucose reportedly accounts for it's occurrence.[11].

The prevalence of candida infection of the hand and feet does not appear to be significantly different for the diabetic population as compared to controls [12], when it does occur, it usually has one of three presentation, candida paronychia usually involves the hands but it may occur on the feet , it often begins at the lateral nail folds as erythema , swelling and separation of the fold from the lateral margin of the nail [13].

Candida infection of the web spaces usually involves the 3-4 web space of the hand or the 4-5 web space of the toes, this area has a tendency to retain moisture due to occlusion from apposing surfaces of skin. Presumably the increased sugar content of the skin encourages the establishment of this infection. The clinical appearance is a white patch of skin, often with central peeling. Toe web space involvement is often mistaken for a dermatophyte infection, but the diagnosis can be confirmed on potassium hydroxide preparation. The third presentation of Candida infection of the extremities is involvement in the toe nail plates.

Phycomycetes Infections:

Hypoglycemia can allow usually nonpathogenic organisms to establish an infection in traumatized skin,

occasionally resulting in gangrene and loss of limb. Diabetic patients with leg ulcers, or non-healing surgical wounds, especially those of the lower extremities, may have a complicating *Phycomycetes* infection. Such an infection should be suspected when lower extremity ulcers or post-traumatic lesions are not responding to therapy. Diagnosis can be confirmed by culture and by histologic demonstration of fungal elements invading vascular channels.

Patients with uncontrolled diabetes with ketosis may be predisposed to deep mycotic infections such as the rare but serious forms of mucormycosis. The characteristic presentation is black crusting or pus on the turbinates, septum, or palate. Without treatment the infection may extend to the maxillary and ethmoid sinuses, the palate, and the orbit. Cerebral involvement occurs in about two thirds of these patients [14].

Material and method:

Selection of subjects:

Subjects for this study were (60) patients (25) male (35) female different ages, suffering from diabetes mellitus and they also infected with fungus in different area of the body, attending the AL-Balad Hospital / Balad city / AL-salahdin governorate from November 2008 until March 2009, the fungal infection diagnosed by swab and scraping from superficial lesions for direct examination with KOH wet preparation or blood and urine culture.

Results:

Table (1) Distribution of the mean concentration of fasting blood glucose according of the patients sex:

Group	Sex	No.	Mean FBG Mg/dl	SD	Min.	Max
Patients	Female	35	283.6	84.8	140	420
	Male	25	273.9	93.3	110	500

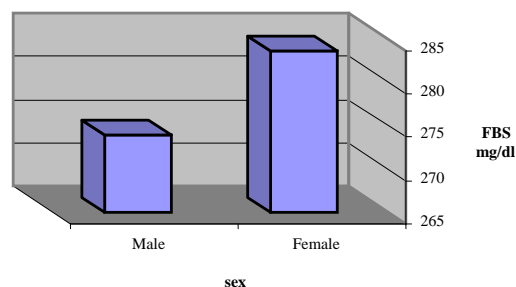


Fig. (1) Distribution of the mean concentration of fasting blood glucose according of the patients sex.

Table (2) Distribution of mean concentration of fasting blood glucose according to the female age groups:

Age (years)	No.	FBG mg/dl
10-30	3	250
31-50	11	278.2
51-70	20	285.7
>70	1	400

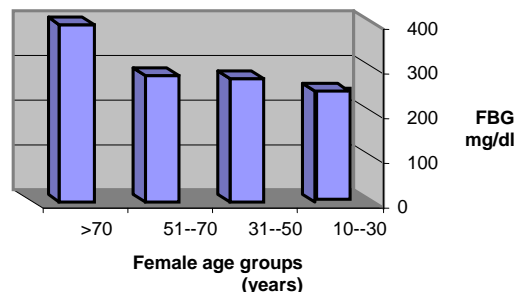


Fig. (2) Distribution of mean concentration of fasting blood glucose according to the female age groups.

Table (3) Distribution of mean concentration of fasting blood glucose according to the male age groups:

Age (years)	No.	FBG
10-30	2	200
31-50	14	267
51-70	9	203.3
>70	0	0

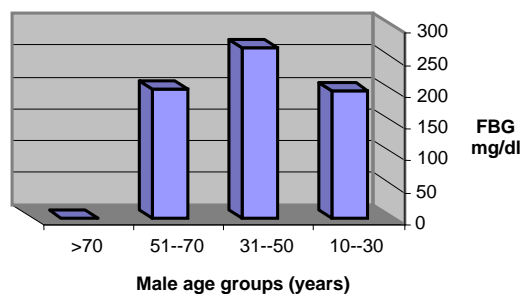


Fig. (3) Distribution of mean concentration of fasting blood glucose according to the male age groups:

Table (4) Distribution of diabetic patients according to the area of fungus infection:

Sex	No	Superficial infection	Systemic infection
F	35	13 , 37%	22, 63%
M	25	19 , 76%	6 , 24 %

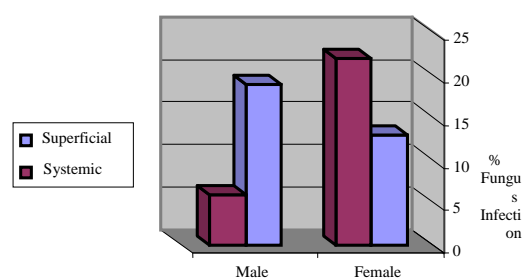


Fig. (4) Distribution of diabetic patients according to the area of fungus infection:

Table (5) Distribution of diabetic patients according to the area of superficial fungus infection:

Sex	No	Finger	Nail
F	22	6 , 27%	16 , 73%
M	18	8 , 44%	10, 56%

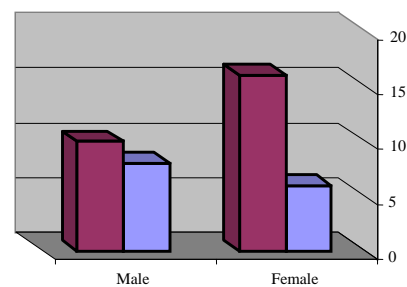


Fig. (5) Distribution of diabetic patients according to the area of superficial fungus infection:

Table (6) Distribution of diabetic patients according to the treatment:

Sex	No	Insulin	Tablet
F	35	16	19
M	25	9	16

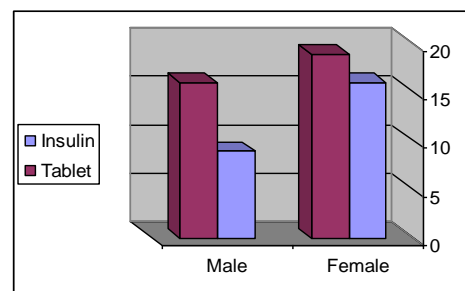


Fig. (6) Distribution of diabetic patients according to the treatment:

Discussion:

Among the 60 diabetic cases attending to the laboratories of the AL-Balad city Hospital to investigation there were 35 (58%) females and 25 (42%) males ,with insignificant differences ($P>0.05$) as was reported by Mahajan et al [8], the data showed female predominant .

The data in present study showed that the age of patients ranged from 10 – 72 years (mean 51 years) the most common age groups were 51-70 (33.3%) , 31-50 (18%) the results agree as was reported by yasmeeen J ,et al [1] .

The results showed that the high concentration of blood sugar was 400 mg/dl in fungus patients group >70 years in comparison with (10-30) years with high significant differences $P < 0.001$.

Our data showed that the majority of male patients was with superficial fungus infection (19,76%) in comparison with female group (13, 37%) , but vice versa the systemic infection (male 6,24% and female 22,63%) , these results may improved that the female hygienic condition is more than male ,because of her nature .

The present study showed that the nail fungus infection in female diabetic patients was with high percentage (16, 73%) in comparison with male nail fungus infection (10,56%) this result may due to the females let her nail grow more than male , in vice versa the finger fungus infection in male diabetic patients (8,44%) was higher than was of the female diabetic patients (6,27%) and may due to the patient work because male hard work than the female .

Also our data showed that the majority of diabetic patients with fungus infection was from the group which tablet treatment in tow sex groups (male 16,64% and female 19,54%) in comparison with the insulin treatment group (male 9,36% and female 16, 46%) the result proved that the tablet treatment of diabetic decrease the immunity of the patient more than the insulin treatment .

Conclusions:

- 1- The fungus (*Candida albicans*) feed on high glucose level and the skin is a favorite site for fungi to flourish.
- 2- The female diabetic patient is more infected with fungi than male diabetic patient.

- 3- The diabetic patient with tablet treatment more affected with fungi than insulin treatment.

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دراسة وطأة الإصابة *Candida* بين مرضى السكري الداخلين إلى مستشفى مدينة بلد في محافظة صلاح الدين

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الخلاصة:

أجريت هذه الدراسة في مختبرات مدينة بلد / محافظة صلاح الدين على 60 مريضاً (25 من الذكور و 35 من الإناث) , احتوت الدراسة على إجراء تحليل سكر الدم الصائم والتحري عن الإصابة بداء الفطريات من قبل الطبيب , أظهرت النتائج إن متوسط تركيز السكر في دم المرضى كان (الإناث 283ر6 ملغم / 100 مل من الدم و الذكور 273ر9 ملغم / 100مل من الدم) . أظهرت النتائج إن أعلى تركيز لسكر الدم عائد إلى المجموعة العمرية الأعلى من 70 سنة بمستوى معنوي $P < 0.001$ مقارنة بالمجاميع العمرية الأخرى. أظهرت النتائج إن النسبة المئوية لمرضى السكري من الإناث المصابات بالفطريات الداخلية كانت أعلى من الرجال (الإناث 63% والذكور 24%) والعكس بالنسبة للإصابات الفطرية الجلدية إذ كانت أعلى بين مرضى السكري من الذكور (الإناث 37% والذكور 76%) . أظهرت نتائج هذه الدراسة إن الإصابة الفطرية لأظافر المرضى المصابين بالسكري من النساء أعلى من مثيلتها من مرضى السكري من الذكور (الإناث 73% والذكور 56%) والعكس بالنسبة للإصابة الفطرية بين الأصابع كانت أعلى في الذكور (الإناث 27% والذكور 44%) . تم الاستنتاج ان نسبة الإصابات الفطرية للمرضى الذين يعالجون بالأقراص اعلى مقارنة بالمرضى الذين يعالجون بالأنسولين ولكلا الجنسين , وهذه إحدى مشاكل الإصابة بمرض السكري .